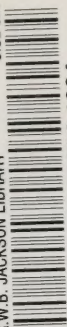


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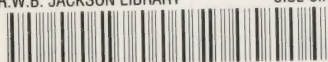
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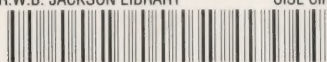
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VOCATIONAL EDUCATION

By WILLIAM T. BAWDEN

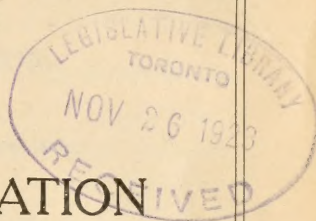
ASSISTANT TO COMMISSIONER
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[Advance Sheets from the Biennial Survey of Education
in the United States, 1920-1922]



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1923



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BULLETIN 106, No. 12

VOCATIONAL EDUCATION

R. WILLIAM T. BARTLEY

SPECIAL AGENT IN CHARGE
BUREAU OF VOCATIONAL EDUCATION

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VOCATIONAL EDUCATION.

By WILLIAM T. BAWDEN,

Assistant to Commissioner, Bureau of Education.

CONTENTS.—Increased popular interest—Relation of vocational education to general education—Important factors of progress—Federal Board for Vocational Education—The part-time school—Business and industry assume a share of responsibility—Industrial teachers' scholarships—The literature of vocational education—Prevocational education—Vocational guidance—Validity of Federal aid legislation assailed—Vocational education in the Army and the Navy—Correspondence schools—Manual arts instruction.

INCREASED POPULAR INTEREST.

During the two-year period there has been a notable increase in the amount of attention given to the subject of vocational education on the part of the general public as well as by educators. There has been much debate among educators over the respective merits and functions of vocational education and general education. Notwithstanding the reams of paper and almost unlimited time which have been consumed in this discussion, there still are educational leaders who appear to regard vocational education and general education as two mutually exclusive horns of a dilemma, and to feel impelled by the exigencies of the situation to range themselves on one side or the other of what they deem to be a controversy over fundamental policies.

Of even greater significance, perhaps, is the extent of the interest taken by the general public. A large number of articles have appeared in magazines of all classes, including those of literary and scientific leanings, and even some of highly specialized outlook, as well as many of the more popular periodicals. Even the daily press has given unwonted attention to questions formerly regarded as too technical to be of interest to the general reader, and much editorial advice has been made available.

One serious defect in much of this general popular discussion of vocational education is that it has been uninformed and superficial. It has too frequently been based on undigested fragments of pedagogical argumentation rather than on first-hand study and grasp of the issues involved. The real estate promoter may be excused for

referring to a junior high school manual arts department as a "trade school," and to handwork in the elementary grades as "vocational courses," and for listing them as such among the assets of a community, but the magazine writer or newspaper editor who essays a discussion of public education on this basis shows clearly his incompetence for the task.

MEANING OF THE TERM "VOCATIONAL EDUCATION."

Unfortunately, educators are themselves in part responsible for the existing confusion, because of the loose way in which the term "vocational" has been used. The enactment of the Smith-Hughes vocational education law of February 23, 1917, established certain standards and tended to fix the definitions of certain types of educational activities, but not even five years of experience under this legislation have served to bring about general agreement as to the meaning of essential terms.

There appears to be abundant evidence to show that manual training or manual arts instruction, far from being rendered obsolete or superfluous by the development of vocational education programs, has become more firmly entrenched as a feature of elementary and secondary education. During the transition period some boards of education have changed the designation of their "manual training" classes to "vocational" classes, and have sought thus to secure to their pupils the benefits of the new education. Application of the standards set up by the Smith-Hughes law, however, shows that certain of the avowed objectives can not be realized under the usual public-school limitations in regard to time, equipment, and qualifications of teachers. In many places this has led to a restatement of the objectives of manual arts instruction and to readjustment of the time schedule and other conditions.

While there still exists in many quarters some confusion as to the basis of distinction, certain principles are gradually emerging which should be of substantial assistance to boards of education and school officials who desire to formulate a consistent and practical program.

The existence of the right type of manual training courses affords to vocational education courses an auspicious start and prevents much undersirable waste of time and effort in the strictly vocational work.¹

A representative of the Smith Hughes type of training suggests a distinction based on function, substantially as follows:

The function of vocational education is, obviously, to train skilled workers in a definite occupation. This should parallel the general education, so that while the student is receiving a degree of general education for the business

¹ Hummel, W. G. The relation of manual training to vocational education. *Indus. Arts Mag.*, IX, pp. 371-372, September, 1920.

of living with his fellows, he is also acquiring the skills, speeds, and habits of thought needed for success in the trade or occupation studied.

The functions of manual training are more general in character. It should give some skill in the use of tools, and include such information, experience, and skills as are applicable to home needs, but particularly it should aim to give a wide view of the industrial world, to develop social adaptiveness, to point the way to different vocations, and to assist in the intelligent choice of a life work.²

Difficulties in interpretation have arisen in part because leaders of the vocational education movement have deemed it necessary to outline their proposals in bold relief, and to emphasize the distinctive features of their program. Vocational education has made headway largely because of definite objectives and specific methods. But there is a stage of development beyond which it may be well to turn from dwelling upon those features which differentiate vocational education from other education, and to devote some effort to promoting understanding of true relationships.

EDUCATION A UNIFIED PROCESS.

No satisfactory philosophy of education can be built up except upon a basis which recognizes education as a unified process or experience. Public education is essentially a formal attempt to supplement the measures employed by the home and the individual to prepare children and youth for the duties and experiences of life. Preparation for life to-day necessarily includes preparation for earning an adequate income through some socially acceptable and useful service. Earning an income is not all there is to life. Preparation for earning an income is not all there is to education, even though at certain periods it may occupy the exclusive attention of the individual.

The time may come when we shall know enough to set up a unified educational program which, so far as public responsibility goes, will take the child at 6 or 7 years of age and graduate him at maturity, fully equipped as to sound health, general and special knowledge, social graces, personal ideals, and wage-earning capacity, and ready to live a full and complete life. In the meantime, practical considerations as well as lack of knowledge require us to do the best we can with conditions as they are.

It is idle to criticize vocational education as being narrowly specialized in outlook, materialistic, and neglectful of the finer things of life. Such criticism is based on misapprehension, as will appear from examination of any authoritative statement of objectives, but it should be recognized that conditions would justify a materialistic program.

² Ibid. (paraphrased).

MEETING DEMONSTRABLE NEEDS.

Nothing could be more materialistic than the economic basis for the demand for more and better educational facilities.³

The congressional commission of 1914 had found a condition of vocational unpreparedness for maintaining our agricultural, industrial, and commercial prosperity. * * * If we were to compete with other nations in the world's markets, and even in our home market which is open to the products of foreign labor, our labor must be made vocationally as efficient and skilled as the labor of other nations.

Lack of interest in this phase of national security and welfare may be offered as an explanation by those who are engrossed with other problems considered of equal or greater importance, but such persons are not justified in closing their minds to the representations of those who are determined that something shall be done about it. Practical measures must be devised to meet practical needs.

Again, many critics of vocational education fail to comprehend the significant fact that the vocational education program to-day is concerned chiefly with efforts to remedy deficiencies in the education of young persons who have secured all that they can of what the public school has to offer. The great problem in vocational education to-day and for the immediate future is the training of those who have already gone to work.⁴ Nothing can be more "neglectful of the finer things of life" than the heartless way in which society has acquiesced in the wholesale termination of school advantages and the absorption of millions of immature youth in competitive business and industry without adequate preparation or sympathetic supervision.

It is true that these young people need suggestions concerning the use of their leisure time, civic duties, and social responsibilities, personal growth, and development, and the conservation of their physical health. But the contribution of the public-school system, and especially of the advocates of college and university culture, toward these ends for youth who have been obliged to leave school, has in the past been practically negligible.

In addition, these young people need specific help in understanding and adjusting themselves to the demands of wage-earning employment. According to the 1920 census there are 1,060,858 children 10 to 15 years of age gainfully employed in the United States. The vocational education movement, recognizing all of these classes of needs, with varying emphasis as circumstances dictate, seeks to do something in a constructive way with an inclusive and well-

³ Federal Board for Vocational Education, Fifth Ann. Rep., 1921, pp. 18-19. Washington, D. C., Government Printing Office.

⁴ Prosser, C. A., at the Minneapolis convention. Man. Tr. Mag., XXII, 9, p. 281, Mar., 1921.

rounded program. Differences of opinion as to means and methods are inevitable, but it would appear that criticism of this program on the ground that it is objectionably utilitarian does not come with good grace from those who countenance the current neglect of potential human resources and offer no acceptable alternative.

PUBLICLY SUPPORTED VOCATIONAL EDUCATION NOT A NEW PROPOSAL.

Public schools, supported out of public funds derived from taxation, have been accepted in principle in this country for many years. The several States have enacted compulsory attendance legislation. Beyond the age limits of compulsory school attendance provision is made, at public expense, of educational facilities in high school, normal school, college, and university, carrying the individual student as far as he chooses to go, and as long as he is financially able to continue his studies.

These institutions serve very definitely to prepare men and women for successful careers in their chosen occupations. The list of occupations for which such specific preparation is available at public expense is an extensive one, and includes the law, medicine, surgery, dentistry, pharmacy, nursing, teaching, architecture, and many subdivisions of engineering, commerce, and agriculture, as well as the many branches of service in the Army and the Navy. There has been no noticeable protest against these provisions; nor is there any evidence to show that those who are responsible for the present outcry against vocational education are consistently demanding their curtailment.

Above the age of compulsory attendance, however, the great majority of our boys and girls and youth are not in school, and, as Mr. Cooley points out, education for these—

has never been felt to be a public responsibility except in a doubting, hesitating way, and to an absurdly inadequate degree. The conviction that systematic, comprehensive, adequate educational tilling of this field at public expense would pay economically, civically, and socially, * * * seems never to have been arrived at.⁵

It is not necessary to base on identical grounds the arguments for publicly supported instruction designed to prepare for the occupations of school-teacher, civil engineer, printer, nurse, or what not. The interests of society are not precisely the same in all occupations. It is conceivable that society may, at some time, consciously and definitely draw distinctions and subsidize the preparation for certain classes of occupations while withholding such aid in other cases. Until such time all who are interested in vocational education may

⁵ Cooley, R. L. Problems of the continuation school. *Indus. Arts. Mag.*, IX, 5, pp. 175-180, May, 1920.

well be encouraged at the substantial progress which is taking place in various phases of the movement.

IMPORTANT FACTORS OF PROGRESS.

The Sixth Annual Report of the Federal Board for Vocational Education includes a review of the five years of activity under the Smith Hughes law of February 23, 1917, and is the most important official source of information concerning recent progress in vocational education.⁶ From this report the following items are taken.

FEDERAL BOARD FOR VOCATIONAL EDUCATION.

The example found in the Federal board membership of providing representation of agricultural, manufacturing, and labor interests has been followed in many of the States, and is receiving increasing recognition year by year. Public education in every phase has become in recent years "more vital and important precisely in proportion as these practical interests have been brought into the account."

The number of State directors and supervisors for vocational education employed under control of State boards has increased from 139 in 1918 to 226 in 1922. The number of schools of all types under approved State plans has increased from 1,741 in 1918 to 4,945 in 1922, and the total enrollment in these schools during the same period has increased from 164,186 to 475,828. See Figure 1.

FINANCIAL SUPPORT OF VOCATIONAL EDUCATION LARGELY A STATE AND LOCAL MATTER.

The report shows the proportions of the funds for vocational education which come from Federal, State, and local sources, respectively. A summary of the figures by years is given in Table 1.⁷

TABLE 1.—*Expenditures of Federal, State, and local money under Smith-Hughes Act, by years.*

EXPENDITURES FOR ALL TYPES OF VOCATIONAL SCHOOLS, NOT INCLUDING TEACHER-TRAINING INSTITUTIONS.

Year.	Total amount.	From Federal money.		From State money.		From local money.	
		Amount.	Per cent.	Amount.	Per cent.	Amount.	Per cent.
Grand total.....	\$36,531,522	\$8,764,689	24.0	\$10,725,318	29.4	\$17,041,514	46.6
1922.....	12,554,294	2,854,046	22.7	3,594,285	28.6	6,105,962	48.6
1921.....	10,507,197	2,391,088	22.8	3,122,828	29.7	4,993,280	47.5
1920.....	6,888,501	1,745,299	25.3	2,008,305	29.2	3,134,897	45.5
1919.....	3,970,607	1,135,823	28.6	1,166,405	29.4	1,668,378	42.0
1918.....	2,610,921	638,430	24.5	833,493	31.9	1,138,997	43.6

⁶ Sixth annual report to Congress, Federal Board for Vocational Education, 1922, pp. x + 405. Government Printing Office, Washington, D. C.

⁷ *Ibid.*, p. 13, Table 2.

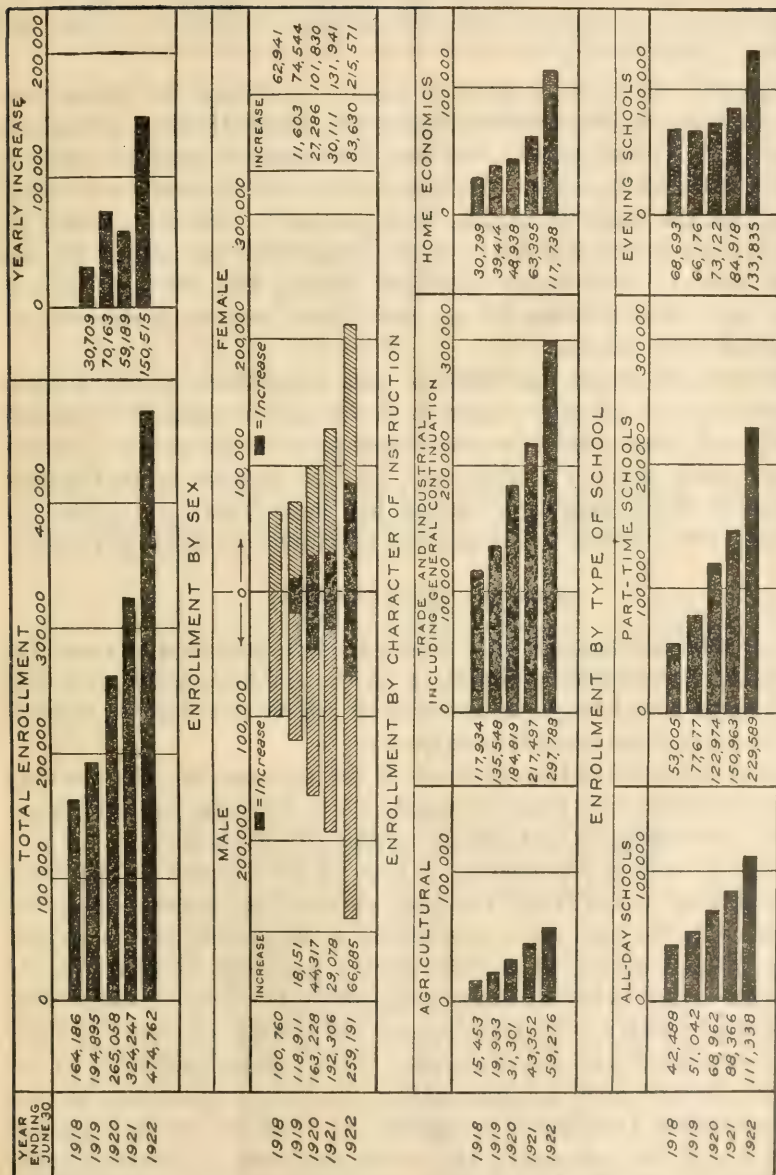


FIGURE 1.—Enrollment in Federally aided schools, 1918-1922. (By permission of Federal Board for Vocational Education.)

EXPENDITURES FOR TEACHER-TRAINING INSTITUTIONS.

Grand total.....	\$7,363,674	\$3,307,372	45.0	\$3,114,903	42.2	\$941,398	12.8
1922.....	2,215,848	1,000,523	45.2	919,862	41.5	295,462	13.3
1921.....	2,111,165	966,505	45.8	951,671	45.1	192,987	9.1
1920.....	1,646,662	731,203	44.4	661,979	40.2	253,479	15.4
1919.....	981,169	424,184	43.2	400,221	40.8	156,762	16.0
1918.....	408,829	184,954	45.2	181,168	44.3	42,706	10.4

Exclusive of funds devoted to teacher training, the proportion of the aggregate expenditures under the Smith-Hughes law which comes from Federal money has been decreasing since 1919, until in 1922 it was 22.7 per cent. The proportion which comes from local money, on the other hand, has been gradually increasing, until in 1922 it was nearly one-half of the total, 48.6 per cent. Of the grand total of \$36,531,522 expended during the five-year period, more than three-fourths, 76 per cent, have been expended out of State and local funds.

The task of preparing teachers and supervisors is not a local responsibility to the same degree as is the maintenance of vocational schools and classes, and hence the report presents a separate distribution of funds devoted to this end. In this division approximately one-eighth of the aggregate amount has come from local money, 45 per cent from Federal funds, and the remainder from State funds.

CONSISTENT GROWTH REPORTED.

The report recommends that more adequate provision be made for promoting home-making education in the public schools, and that the Federal board be given funds with which to subsidize instruction in commercial-education subjects.

One of the outstanding features of the program for the training of teachers is the fact that practically every State has made arrangements to include practice teaching as part of the training.

Steady growth is reported in all lines of work under the direction of the Federal board, but "the most outstanding feature of the development in the past five years has been the growth of the general continuation school." The three major purposes of this type of school are stated to be (1) better preparation for duties as individual members of society; (2) training for citizenship, adjusted to individual experience and requirements; (3) vocational guidance of the best type, and as much occupational training as circumstances permit.

Foremanship training is recognized as "one of the best promotional devices for advancing the whole program of industrial education," because of the position of influence and responsibility occupied by the foreman in every place of employment.

INDUSTRIAL EDUCATION FOR GIRLS AND WOMEN.

The report gives special attention to problems of trade and industrial education for girls and women.

One woman out of every five in the United States is a wage earner. More than one worker out of every six engaged in mechanical and manufacturing pursuits is a woman, the number of such women being approximately 2,000,000.

The present tendency in women's employment is "away from traditional trades toward manufacturing industries." Because of the large numbers of girls and women employed there is an increasing development of supervisory positions open to qualified women. The purpose of industrial education for girls and women is three-fold: (1) To prepare the girl to enter the field of wage earning; (2) to enable the girl already employed to improve her status; (3) to insure progression or advancement of the individual.

The report lists 58 occupations, in 9 different classifications, for which special vocational courses of instruction were open to women and girls in 1920.

CONFERENCES.

In the experience of the Federal board conferences have been found a very important means of promoting the work of vocational education in the States.

They provide opportunity to present new problems, to exchange experiences, and during the first five years of the administration of the vocational education act have served as training schools where the philosophy of vocational education and the policies in regard to the administration of the vocational education act could be brought to the attention of State administrators and teachers.

IMPORTANT CHANGES IN THE WORK OF THE FEDERAL BOARD.

Lack of space prevents adequate treatment of two important phases of the work of the Federal Board for Vocational Education: Rehabilitation of disabled soldiers, sailors, and marines; and vocational rehabilitation of the civilian disabled.

By the terms of the Sweet Act, approved August 9, 1921, all activities of the Federal board having to do with the rehabilitation of disabled soldiers, sailors, and marines, were transferred to the newly created Veterans' Bureau. The original act providing for this service was approved June 27, 1918. Full accounts of the work are to be found in the Annual Reports of the Federal board for 1920, 1921, and 1922.

The Smith-Sears Act, approved June 2, 1920, provided "for promotion of vocational rehabilitation of persons disabled in industry or otherwise and their return to civil employment," and vested the administration of the act in the Federal Board for Vocational Edu-

cation. No reliable data are available concerning the number of men and women who are vocationally unfit or disabled. "Evidence is, however, conclusive that this body of vocationally unfit is large and that its cost of maintenance is a tremendous social cost." Even more significant "is the fact that the cost is avoidable. * * * As a general proposition, it may be laid down that it costs more to support a disability than to cure it."

THE PART-TIME SCHOOL.

In view of the facts that, as reported by the Federal Board for Vocational Education, 43 States are now maintaining part-time schools of various types for the benefit of young persons who have left public school to go to work, and that 21 States have enacted State-wide mandatory or permissive part-time school laws, it seems advisable to give further attention to these schools.

OBJECTIVES OF THE PART-TIME SCHOOL.

The part-time school is developing rapidly and significantly as an agency of service to gainfully employed youth during that period included between the age after which compulsory attendance at the full-time day school is no longer required and the age at which the youth may profitably enter certain classes of occupations having the qualities of permanency, opportunity for future growth and personal development, and financial regards adequate to the maintenance of American standards of family life. For many youth this period includes the years between the ages of 14 and 18, and the school machinery set up by the laws in the several States applies to varying portions of this period.

It would seem that the part-time school should enlist the sympathetic interest, and is entitled to the earnest support, of every true believer in education, and, above all others, of the public-school man, for at least two compelling reasons:

(1) The part-time school deals almost exclusively with boys and girls who have left the regular public school permanently, with their schooling admittedly incomplete and inadequate. Any agency which can take up this task at the point where the public school has laid it down and carry on even a little further must be regarded as an ally and a reinforcement. There can be no competition between the two unless the regular public school permits the part-time school to become more interesting, more effective, and more genuinely serviceable.

(2) Far from being open to the criticism of narrowness of aim or restriction of outlook, the program of the part-time school is even broader than that of the public day school, certainly broader than that of the traditional school. The part-time school aims not only

to complete the task which has been interrupted by untoward circumstances with which the public school has thus far been unable to cope successfully, but it sets up for itself objectives beyond those which have been formulated by the day school.

It is true that mistakes have been made in the name of the part-time school, and experiments have not all turned out as anticipated. It is believed; however, by those competent to judge that there is no question of the essential soundness of the program, and that most of the difficulties and disappointments thus far experienced can be accounted for on other grounds, such as lack of informed leadership, lack of properly qualified teachers, and lack of facilities.

In order to suggest the obvious tendency of the movement and the soundness of the foundation which is being laid by its leaders it is appropriate to record here the analysis of the objectives of the part-time school suggested by Doctor Myers.⁸ Slightly condensed, they include:

(1) To increase the proficiency of its pupils in the jobs they now hold, however temporary these jobs may be.

(2) To help them get into work for which they are fitted, and then to train them for this work so far as school training is necessary.

(3) To help them obtain from their employment the best training it has to offer.

(4) To help them protect and improve their health under employment conditions.

(5) To help them understand and interpret in terms of their jobs some of the more fundamental economic principles underlying industry and business.

(6) To help them see and assume civic responsibilities.

(7) To help them form desirable habits of work and of using leisure time.

(8) To help them develop attitudes of mind toward work, toward employers, toward fellow workers, and toward the community that make for good citizenship.

SPECIAL PROBLEMS OF THE PART-TIME SCHOOL.

(1) The most serious problem is that of the magnitude of the task to be performed. Although the number of youth in part-time schools, as reported by the Federal board, increased from 53,000 in 1918 to 228,000 in 1922, this enrollment is "less than one-tenth of the boys and girls 14 to 17 years of age reported by the census in 1920 as not attending school of any kind."

(2) The variety of individual needs to be met is practically unlimited.

In its ultimate development in our cities, the part-time vocational school classes must become as varied in subject matter taught and supplementary equipment as the commerce, trades, and industries of the communities in which the schools are conducted.

⁸ Myers, G. E. How can we save part-time education? *Voca. Educ. Mag.*, I, 3, pp. 229-231, Nov., 1922.

Mr. Cooley justifies the demand for more adequate support of the continuation school, as an attempt to solve these problems, on two rather striking grounds:

(a) A very large proportion (estimated at 90 per cent) of the wage-earning jobs open to youth under 18 years of age are undesirable from the standpoint of offering opportunity for personal development and direct preparation for any sort of skilled employment, but—

I know from practical experience with thousands that when the job is hooked up with the school * * * the number of "dead-end" situations is vastly diminished, and the "dead-end" jobs cease to be the very great menace they otherwise constitute.⁹

(b) The cost of the burden that would be assumed by returning these employed youth to the full-time schools would be prohibitive, and that at the same time the economic contribution to the community made by this group constitutes a special claim to recognition. A report on the weekly earnings of 8,078 persons under 17 years of age employed on work permits in Milwaukee in February, 1920, "shows a weekly earning of \$85,495, or an annual earning of \$4,445,754." To provide this sum, in order to permit these young people to return to full-time school, "would require an investment at 5 per cent of about \$89,000,000," to say nothing of the increased burden on the full-time school system. Furthermore,

the employed people under 18 years of age in any community big enough and live enough to keep its young people at home earn * * * enough money to pay all teachers' wages of all the children in all the full-time schools, public, private, and parochial, elementary, and high, twice over.¹⁰

(3) The organization of part-time classes in a small community, or in one having only a limited number of employed minors, presents many special difficulties. Aside from shop facilities made available by the junior high school or some other department, "not much variety of shop instruction can be offered economically in a continuation school of less than 1,000 students."¹¹

(4) Indifference on the part of employers, school superintendents and teachers, and parents, and the difficulties involved in having all parties convinced and ready to act at the same time have delayed the development of the part-time school. According to the experience in at least one State, it is sometimes easier to secure the cooperation of employers and the workers than it is to arouse the interest of superintendents, teachers, and parents.¹²

⁹ Cooley, R. L. Problems of the continuation school. *Indus. Arts Mag.*, IX, 5, pp. 175-180, May, 1920.

¹⁰ *Ibid.*, p. 177.

¹¹ Evans, Owen D. Functions and organization of an urban continuation school. *Nat. Soc. for Voca. Educ.*, Atlantic City convention, Feb., 1921.

¹² Smith, K. G. Establishing a State program of part-time education. *Man. Tr. Mag.*, XXIII, 4, pp. 107-110, Oct., 1921.

(5) One type of difficulty, inherent in the development of a new enterprise, has had to do with legislation. Here, as elsewhere, experience shows that conditions in the several States vary to such a degree that it is not satisfactory to borrow legislation without exercising the greatest care. And, again, it has not been easy to amend a law in the light of practical experience. "A part-time law which can not be enforced is a failure."

(6) Another serious difficulty, as pointed out by Doctor Myers, is that in some States other laws affecting part-time school pupils have not been adjusted to the part-time educational laws. The remedy suggested is to harmonize the requirements and definitely coordinate the administration of the compulsory school-attendance law, the part-time school law, the child-labor law, and the juvenile-delinquency law. Progress appears to lie in the direction of recognizing by law the period from 6 to 18 years of age as the period of education, and especially as a period of some degree of public responsibility for all children and youth, and the establishment of methods of child accounting which will include periodic reports from "every child whether at home, in an institution, in public or private school, or in employment."¹³

(7) An analysis of reports from 50 or more principals or directors of continuation schools in various parts of the country showed that the most pressing problems in the field of administration of part-time education may be classified as follows:¹⁴

<i>Problems.</i>	<i>Number of times mentioned.</i>
Finding suitable subject matter-----	28
Securing competent teachers-----	21
Gaining the cooperation of parents and employers-----	20
Providing adequate and suitable rooms-----	14
Getting the pupils to cooperate fully-----	11
Maintaining regular attendance-----	10
Financing the new work-----	10
Arranging satisfactory programs-----	8
Providing suitable equipment-----	6

BUSINESS AND INDUSTRY ASSUME A SHARE OF RESPONSIBILITY.

One noteworthy indication of progress is found in the fact that, while educators are realizing more and more clearly that vocational education is much too big a task for the school alone, business and industry are awakening to a sense of their share of responsibility. Employers who give the matter serious consideration perceive that the preparation of properly qualified workers includes certain items

¹³ Myers, G. E. How can we save part-time education? *Voca. Educ. Mag.*, I, 3, pp. 229-231, Nov., 1922.

¹⁴ MacDonald, D. J. Outstanding administrative problems in part-time education. *Indus. Arts Mag.*, X, 9, pp. 323-328, Sept., 1921.

that can only be secured economically and effectively by the worker "on the job," as well as certain other items for which the schools may legitimately be held responsible.

More and more, business and industry are making this distinction, and preparing to take appropriate action. Charles R. Allen has stated that never before in the history of industrial education has there been such active seeking after information concerning means for improvement of plans for training in industry. For obvious reasons one very effective means is through cooperative effort, and pioneer work is being done by a number of influential trade and industrial organizations.

The extent of the movement in this direction is suggested by Doctor Prosser, who found at least 25 national associations of employers setting up organized systems of training for employees, some of them with endowments ranging from \$2,000,000 to \$10,000,000.¹⁵ A partial list of such associations, gathered from various sources, includes the following:

United Typothetæ of America.

National Pulp and Paper Association.

National Association of Granite Manufacturers.

National Association of Plumbers.

National Association of Cleaners and Dyers.

National Metal Trades Association.

National Founders' Association.

American Hotel Association.

National Personnel Association, continuing and combining the activities of the National Society for Corporation Training and the National Industrial Relations Association.

A striking illustration of the progress which has been made in this direction is given by Doctor Myers, who reports that in 1915-16 an investigation of every industrial establishment in greater New York City, which employed 20 or more children under 16 years of age, showed that not one employer was willing to cooperate with the board of education in a part-time school arrangement, and that "the general attitude was that a company could not afford to release young workers from employment four hours per week for educational purposes even though the cost of instruction was borne by the city."¹⁶ By contrast was cited the completion in Akron, Ohio, in 1920 of an educational and recreational building costing \$3,000,000, paid for entirely by the Goodyear Tire & Rubber Co., and housing among other features an Industrial University, enrolling upward of 5,000 employees as students, many of whom attend classes on full pay on company time.

¹⁵ Editorial, *Voca. Educ. Mag.*, I, 1, p. 4, Sept., 1922.

¹⁶ Myers, George E. How industry is meeting the problem of industrial education. *Proc. Western Arts Assoc.*, Detroit convention, May, 1920.

Leaders in vocational education should assume responsibility for promoting a better understanding of their work. Doctor Prosser has emphasized the need for waging a continuous campaign to educate the general public concerning the objectives of vocational education, and the means deemed essential for the securing of these ends, and has expressed the opinion that "the greatest weakness of the work in some localities is the failure of the vocational educator to recognize that his program needs this leadership more than it does the meticulous administration of details."¹⁷

INDUSTRIAL TEACHERS' SCHOLARSHIPS.

To aid in assuring a supply of qualified teachers for vocational schools, two States have established systems of scholarships for prospective teachers in training. The following paragraphs are prepared from reports submitted by State officials:

In Wisconsin subsection 3 of section 2033 of the statutes provides for an annual appropriation of \$20,000 for scholarships to be awarded by the State board of vocational education. With a part of this fund the board each year grants 10 Grade A scholarships of \$50 per month each, for a period of nine months. Students who receive these scholarships are required to attend Stout Institute, and since the courses prescribed are two-year courses it is the practice of the board to renew the scholarships for a second year. The scholarships are granted only to men who have had at least three years of successful trade experience, and who have expressed a willingness to become teachers in the vocational schools of Wisconsin if granted the scholarship.

The New York Legislature in 1920 passed the industrial teachers' scholarship act providing \$50,000 annually for the training of industrial, trade, and technical teachers. In 1920 this sum was reduced to \$25,000 annually. This is not a measure for the improvement of teachers in service, but aims to improve the teaching personnel in day and evening vocational schools and part-time schools by drawing into the service a new group of specially qualified persons. Twenty-five scholarships of \$1,000 each are awarded annually to applicants who are required to pursue special courses at the State Normal School at Buffalo. The satisfactory completion of a course secures for the individual a life license to teach his trade in the vocational schools of the State.

The act is administered by the division of vocational and extension education of the State Department of Education, which deter-

¹⁷ Prosser, C. A. The outlook for industrial education. *Voca. Educ. Mag.*, I, 1, pp. 3-5, Sept., 1922.

mines each year, on the basis of the needs in the field, the kinds of occupations from which men shall be selected for the scholarships, establishes the qualifications, rates the applicants, and outlines the training courses to be pursued. In the examination and rating of applicants the division is assisted by a special committee consisting of three representatives each of the State Federation of Labor, associated industries, and the State Department of Education.

THE LITERATURE OF VOCATIONAL EDUCATION.

In no way, perhaps, is recent progress in vocational education more strikingly apparent than in the development of the literature of the subject. In addition to a truly remarkable output of treatises, manuals, and textbooks from the usual publishing concerns, the following special sources are noted:

Agencies of the Federal Government, including especially the Federal Board for Vocational Education, and to a lesser extent the Departments of Commerce, Agriculture, Labor, and Interior, have published a large number of bulletins and reports on various phases of vocational education.

In addition to the foregoing, the War Department prepared and issued shortly after the close of the war a unique series of handbooks relating to training for occupations in the Army.

State boards for vocational education in most of the 48 States have had occasion to begin the publication of series of bulletins relating to the new types of activities under their supervision.

Numerous educational institutions, particularly those engaged in the preparation of administrators and teachers of vocational education, and including universities, normal schools, and other institutions, have published reports of studies, investigations, and proposals in great number and variety.

The more important correspondence schools have contributed extensively to the literature of vocational education, and at least one of the largest of these institutions is now making its text material available to the public.

PERIODICALS.

In addition to an increasing number of special articles in most of the educational journals of general circulation, the vocational education interests are now served by the following:

Vocational Education Magazine, established in September, 1922, by the National Society for Vocational Education as the official organ of that society, in response to what was held to be "an urgent need for a journal devoted exclusively to the interests of special education for vocations other than the professions." This is a

monthly magazine (10 numbers annually) maintaining the following special departments each with its staff of editors: Agricultural education, commercial education, home-making education, industrial education, part-time and continuation education, training in industry, editorial, book reviews, and news notes.

Industrial Education Magazine, established in September, 1921, to succeed and continue the *Manual Training Magazine*. This is a monthly magazine, maintaining a number of special departments, including plans and equipments, mechanical drawing, electrical work, auto mechanics, printing and bookbinding, farm mechanics, metal working, art crafts, woodworking, editorial, special articles.

Industrial Arts Magazine, established in January, 1912. This is a monthly magazine devoted to industrial arts education, manual training, art instruction, domestic science, and related subjects, and special articles on various phases of vocational education.

Mention should also be made of the *Vocational Summary*, published monthly for a time by the Federal Board for Vocational Education, Washington, D. C., as a medium of communication between the board and its agents in the field, State educational authorities, and the public generally. The first number appeared in May, 1918, and publication was discontinued in July, 1921, for lack of funds.

Personnel Administration, published monthly as the official organ of the National Personnel Association, succeeding *Corporation Training and Personnel*. The association has recently changed its name to American Management Association, and this will in turn lead to a change in the name of the journal.

National Vocational Guidance Association Bulletin, published monthly as the official organ of the National Vocational Guidance Association, to provide "a means for the interchange of ideas and news, an opportunity for presenting the activities of the national and local associations, and to place before all workers formal statements upon theory and practice" of vocational guidance.

One notable aspect of recent progress is to be found in the adjustments that are being made in the work of the regular public day school as a result of the influence of the vocational movement, and, conversely, the gradual broadening of the outlook of the vocational education program to include much more than simply "specific preparation" for the technical processes of a skilled trade.

It is perfectly clear that the movement has gone far enough to constitute a vital reform in the schools. * * * If anyone is in doubt * * * let him consider how far the commercial school has gone in recent years in remodeling its geography, in introducing mechanical science in its elemental stages, in applying arithmetic to industrial problems, and in substituting

informing industrial reading for the stories which used to constitute the reading material of the schools of 20 years ago. There is a new spirit in elementary education; it is the spirit of attention to practical needs.¹⁸

PREVOCATIONAL EDUCATION.

The term "prevocational education" continues to be a stumbling block to some educators, although the service which it represents is becoming available to a constantly increasing number of children. Two practically synonymous terms are also attaining a certain vogue: "Vocational finding courses" and "vocational try-out courses."

In a number of cities the work has developed to considerable proportions as a part of or closely associated with a general plan of vocational and educational guidance. Professor Brewer lists 17 occupations for men and 11 for women, "all of which are within the range of the try-out plan" in the junior high school, and points out that "recent experience in a number of junior high schools has shown that in the seventh and eighth grades six weeks' courses in each of several practical arts can be given with satisfaction to the instructor and the children."¹⁹

VOCATIONAL GUIDANCE.

In a summary of recent progress in vocational guidance Professor Kitson calls attention to the "astonishing ramifications" of the movement:²⁰

Public schools are adopting it as a part of their regular program. Colleges, universities, and technical schools are installing departments of vocational guidance or personnel. Particular attention is being paid to the vocational guidance of college women. * * * Business is expressing an interest in vocational guidance through its national organizations. * * * There is also a large group of miscellaneous organizations. * * * An increasing number of governmental agencies are adopting the methods of vocational guidance. * * * Psychologists and physiologists are doing research work in fields related to vocational guidance. Finally, labor organizations * * * recognize many points of interest and importance in vocational guidance.

The annual convention of the National Vocational Guidance Association, Detroit, Mich., December 1 and 2, 1922, afforded evidence of notable progress, according to the secretary of the association, who states: "Never has a series of papers presented more definite evidence of a real grappling with the problems * * *. Apparently we have entered upon the task of definite accomplish-

¹⁸ Judd, C. H. Fundamental educational reforms. *El. Sch. Teacher*, Jan., 1923.

¹⁹ Brewer, J. M. The need for try-out courses in the junior high school. *Indus. Arts Mag.*, XI, 3, pp. 85-88, Mar., 1922.

²⁰ Kitson, H. D. Progress and coordination in vocational guidance. *Nat. Voca. Guidance Assoc. Bull.*, I, 8, pp. 123-124, Mar., 1923.

ment and careful analysis.”²¹ According to the same authority, all the papers of the convention could be grouped under four heads: (1) Analysis of some problem or phase of vocational guidance work; (2) definite proposals of workable plans for new steps; (3) reports of research; (4) reports of actual accomplishments.

The United States Bureau of Education conducted two conferences dealing with important phases of vocational guidance, with the following subjects of discussion: “Public school supervision of employed boys and girls,” Milwaukee, Wis., January 11, 1922; “Studies about occupations in the public schools,” Detroit, Mich., November 29, 1922.

Significant details concerning progress in vocational guidance may be noted in a recent summary of reports from 130 high schools, in 32 States.²² The average enrollment in these schools was 1,002. Of the 130 schools, 97 offer some special vocational courses; 54 schools have available reports of surveys of local occupational opportunities; 46 report prevocational courses or vocational guidance in grades 7 and 8; 81 schools make an organized effort to discover vocational aptitudes through work in English; 54 schools require or urge teachers to act in the capacity of vocational counsellors; 34 schools offer courses in vocational civics or “occupations”; 31 schools use a text in the study of occupations; 68 schools require written reports on local industries or other assigned vocational topics; 75 organize class excursions to local industries and commercial establishments; 51 schools employ a director or special teacher responsible for vocational guidance; in 62 schools this work is handled by the principal, and in 26 schools by the deans of boys and girls; 86 schools have employment or placement bureaus, and 43 function through central bureaus, usually under the direction of the board of education; 43 schools report employment supervision and follow-up work; 36 schools make some use of mental tests as an aid in determining vocational aptitudes. “The ideal is every teacher a vocational counsellor.”

Vocational guidance of the greatest benefit to the individual is that guidance given through a series of controlled practical experiences, on selected jobs, drawn from a wide range of occupational activities.²³

VALIDITY OF FEDERAL AID LEGISLATION ASSAILED.

An event of great potential significance to the vocational educational movement occurred in the filing of a suit in the October, 1922,

²¹ Brewer, J. M. Impressions of the convention. *Nat. Voca. Guidance Bull.*, I, 7, p. 103, Feb., 1923.

²² McDougall, H. R. Vocational guidance in high school. *Indus. Arts Mag.*, XI, 4, pp. 133-135, Apr., 1922.

²³ Rodgers, R. H. Organization and teaching of industrial subjects in part time or continuation schools. *Indus. Arts Mag.*, XI, 4, pp. 135-137, Apr., 1922.

term of the Supreme Court of the United States, by the attorney general of the State of Massachusetts, to test the constitutionality of the Sheppard-Towner Act, approved November 23, 1921, entitled "An act for the promotion of the welfare and hygiene of maternity and infancy." The principles of Federal aid embodied in this act are similar to those of the Smith-Hughes Vocational Education Act, so that the decision in this case will have a direct bearing on operations carried on under the latter.

The basis of the complaint is that the burden of paying for the expenditures incurred under legislation of this character "falls very unequally upon the several States," that the act is "a usurpation of a power not granted to Congress by the Constitution, and an attempted exercise of the power of local self-government reserved to the States by the tenth amendment," and that the proposed cooperation in effect sets up an agency that is neither the Federal Government nor the State government but "an alien form of government not provided for nor recognized by the Constitution, but inconsistent with and contrary to its provisions."

VOCATIONAL EDUCATION IN THE ARMY.

No account of recent progress in vocational education would be complete without some reference to the educational programs established in the War Department and the Navy Department. One of the striking developments of the war period was the utilization by the Army and the Navy of the lessons learned in civilian vocational education experience, and the selection and adaptation of various phases of educational service to the emergency requirements of national defense. The rapid readjustments and retrenchments following the close of the war necessarily brought many of these activities to a close, but much that is of significance to students of the subject remains on a permanent basis.

The first important step in the Army was the formulation of a system of personnel specifications which defined the personal characteristics, skill, and knowledge required in each type of service. From the educational point of view these specifications served the purpose of defining the objectives of training and determining the courses of instruction needed.

Later, a beginning was made in the development of a series of objective tests, consisting of (1) aptitude tests designed to indicate whether the individual possesses a specific kind of ability, and (2) tests of proficiency, intended to reveal relative degrees of proficiency in specific abilities. This is one of the important tasks interrupted by withdrawal of funds, but it had proceeded far enough to be suggestive of great possibilities.

The educational advantages offered by enlistment, and particularly the opportunities for vocational training, have been recognized by many young men and have served to bring about substantial increases in enlistment and in raising the standards of personnel. The extent of the influence exerted by the Army is reflected in the following figures: Summer camps in 1922 accommodated 22,119 men for 30 days of specialized instruction, including physical, military, and vocational training; the Reserve Officers' Training Corps enrolled 104,000 students in 341 units, in 227 colleges, universities, and other institutions; each year there are discharged about 40,000 young men who have had three years of training, including some form of special vocational instruction.

The most significant contribution, however, is the development by the Army of technic and methods which are regarded by those competent to judge as "a contribution of the highest order to the pedagogy and administration of trade teaching." The essential features of the plan have been summarized as follows:²⁴

(1) It gives an analysis of the trade on the basis of what a man must be able to do.

(2) It lists the essential topics of information in the trade.

(3) It requires the student to analyze his job in the terms of the operations of the trade.

(4) It requires the student to make a definite plan of the order of procedure.

(5) It enables the class, or individuals of the class, to handle any kind of practical job within the range of their ability and at the same time to get the utmost of the educational elements out of it.

(6) It eliminates the time element. When a man becomes proficient in an operation he is given a proficiency mark. When he is proficient in all of them his training is completed without respect to time.

(7) A statement can be given of exactly what a man is *able to do*.

(8) The topics of information and the vocational problems are taught by the shop teacher in the shop.

(9) The analysis of a trade shows that a very large number of the operations of the trade are only semiskilled in character. We are, therefore, able to direct the training to the highly skilled operations rather than to the semiskilled operations which require little time to master.

Education in the Army has been placed in the War Plans Division, under the General Staff, and has had the services of an advisory board of civilian educational experts. From the beginning a broad general policy has prevailed of offering throughout the service "adequate and immediate opportunity for the educational and vocational training of such men as desire it" which will "fit men for effective military service and for success in civil life."

²⁴ Selvidge, R. W. Teaching a trade in the Army. *Man. Tr. Mag.*, XXII, 7, pp. 246-259, Jan., 1921.

VOCATIONAL EDUCATION IN THE NAVY.

On June 1, 1920, a new educational plan was put into operation by the United States Navy, which includes opportunities for vocational training on a comprehensive basis. In its recruiting literature the Navy has consistently emphasized the advantages of travel and study afforded by enlistment; and since the equipment of a modern fighting ship includes a wide range of machinery and mechanical and electrical appliances, as well as a complement of officers trained in many technical and scientific lines, unusual facilities are available for practical education.

After nearly a year of preliminary study and preparation the plan of education on shipboard was given a trial on the *Rochester*. The plan commended itself from the start and rapidly spread until within a few months it was in operation in all the fleets. The essential features of the plan are:

- (1) The school work is optional.
- (2) An education officer is detailed to the ship to encourage and aid the men in their school work.
- (3) The commanding officer sets aside specific time for study.
- (4) The chief methods of instruction include the use of study outlines, based on the best experience of correspondence schools; the use of motion pictures, lantern slides, charts, etc.; and the counsel of an education officer.
- (5) The education officer observes a definite schedule of office hours in order to be accessible to the men for individual interviews.

The plan utilizes the advantages of the better type of correspondence instruction, with its emphasis on individual effort and its provision for individual advancement, and adds the personal attention and guidance of experts in various lines. "The education system is teaching the young man of the Navy to succeed in his job, with the incentive of a better job and a greater success ahead."²⁵

The plan includes 81 courses of instruction available or in preparation, classified into 12 groups, as follows: Navigation, seamanship, ordnance and gunnery, deck artificer, communications, steam engineering, electrical engineering, gas engineering, yeomanry, commissary, pharmacy, general subjects. In March, 1922, the total enrollment in education courses was 6,228 men, representing 241 ships and 6 shore stations. To illustrate the scope of the work it may be stated that from November 1 to December 15, 1922, the central education office sent out to the ships 58,429 lesson assignments, 1,444 textbooks, and 547 keys.

In March, 1923, the work was reorganized as the Training Division of the Bureau of Navigation, and the division is now in charge of all educational activities under the Navy Department except the Naval Academy and certain stations. The division consists of three

²⁵ Oregon Journal, Portland, Oreg., Apr., 1923.

sections: Training and education of officers, training and education of enlisted men, morale and recreation.

Lack of space prevents more than a passing reference to the special adaptations of vocational courses which have been worked out in the United States Marine Corps. Opportunities for instruction in a wide range of subjects, under skilled and sympathetic direction, are open to all members of the service.

CORRESPONDENCE SCHOOLS.

Recent interesting developments in two of the larger correspondence schools may be cited as evidence of a growing appreciation of the broad significance of vocational education and as examples of the stimulus to public education afforded by private agencies which are more free to note and respond to new demands. Since a large proportion of the service rendered by the correspondence schools is in the field of vocational education, their experience should be suggestive to public schools working on similar problems.

In many cases students have enrolled in correspondence courses leading to occupations or positions for which they do not have the necessary qualifications, as, for example, the student who aspires to be an electrical engineer but who is lacking in the taste for and ability in higher mathematics. To deal with the special problems of students who become discouraged because of unsatisfactory progress, the American School, Chicago, Ill., established early in 1921 a "vocational guidance service," and adopted a definite policy of endeavoring to "graduate a larger proportion of the students enrolled and thereby increase the effectiveness of our service."

After much careful study a questionnaire consisting of 112 questions and mental tests was evolved for the purpose of securing from the student the information deemed essential as a basis for helpful advice. This is accompanied by a 270-page book setting forth a general discussion of the questions. After the plan has been fully worked out it is expected that the use of this vocational guidance service will be made compulsory on the part of every prospective student and that it will function "as an entrance examination to the various courses and as a means of preventing misfits as far as it is humanly possible." Later it is proposed to offer this vocational guidance service to the general public.

In order to render an enlarged service to education and industry, the International Correspondence Schools in 1920 launched a program of interest to the public at large. It was recognized first that the movement must be characterized by an unselfish service to the public, having no thought of immediate return. Secondly, it was apparent that an increasing demand for education would benefit all

kinds of schools, public and private, the International Correspondence Schools included. That the facts bear out this premise is now seen.

To accomplish these ends the schools established the industrial service division, "Trained Men," a monthly magazine, and the lecture bureau. The industrial service division has for its primary object the developing of cooperative business relations with organized education and industry. Prejudice against instruction by the correspondence method has given way to confidence in the application of this method to the solution of many vocational educational problems. Already more than 1,300 manufacturers have utilized the educational facilities of this institution in the promotion of their own training programs. These establishments vary in size from 100 to 100,000 employees. The application of this cooperative arrangement varies according to the conditions from weekly interviews by International Correspondence Schools field men with students and prospective students to the entire training program of apprentices and others. Monthly reports to employers showing the progress of every student-employee have brought about a 37 per cent increase in the studying done.

The industrial service division is called upon to make special investigations and reports relative to the educational problems confronting business and educational leaders.

"Trained Men," a monthly magazine for executives, is one of the agencies built to serve industry and education as a clearing house of information pointing out the part that education plays in the solution of organization problems. It contains messages from outstanding political, professional, and business leaders.

The lecture bureau was organized in December, 1920, as a contribution of the International Correspondence Schools to a thinking public interested in building citizenship of the highest type. During 1921 and 1922 the manager of the bureau delivered 720 addresses in 730 days before every type of organization. The International Correspondence Schools considered that what has been accomplished in setting up friendly relations with industrial concerns, educational institutions, public-service corporations, labor organizations, chambers of commerce, manufacturers' associations, etc., is only an index to what may be expected through future developments.

Arrangements have been made with 38 State divisions of vocational rehabilitation for the retraining of persons who are eligible to receive the benefits of the rehabilitation act. Several hundred disabled persons, most of them in placement training, are studying International Correspondence Schools courses.

MANUAL ARTS INSTRUCTION.

As suggested in a previous paragraph, no account of recent developments in vocational education would be complete without noting the extent to which the movement is being influenced by the general educational point of view, and to which it, in turn, is profoundly affecting other phases of the work of the public schools. The effects may be discerned most clearly perhaps in the modifications which are taking place in the manual arts instruction offered in elementary and secondary schools, particularly in the seventh, eighth, and ninth years, although significant readjustments are apparent elsewhere.

Of chief importance is a growing emphasis upon the necessity for maintaining proper standards of technic in all lines of school shop drafting and laboratory work. Leaders in the manual arts field have contended for this for years, but it is now receiving more general recognition. The ultimate bases for standards of technic are to be sought in the requirements of practical life. According to this view, for example, the acceptability of the weld in a link of chain is not determined by comparison with the best average performance of ninth-grade boys, but by comparison with an accepted commercial product.

A necessary corollary demands the exercise of judgment in selecting projects for the school shop the accomplishment of which, on the basis of commercial standards, lies within the capacities of the students and other practical limitations.

The application of commercial and industrial standards to school shopwork has raised a number of vital questions relating to equipment, qualifications of teachers, the time element, and the like, the solutions of which have not all been fully worked out. The delay has been due in part to inertia and to the usual difficulties involved in following a line of logical reasoning to new conclusions. Much progress has been made, however, in the attempt to use tools, processes, and materials in the school shop in accordance with what is regarded as the best commercial practice.

As an illustration of the direction in which this point of view leads, a city superintendent of schools may be quoted who calls attention to the fact that undoubtedly some school shop projects "Are so valuable educationally that commercial efficiency may be forgotten," and adds:

No high-school commercial department would succeed if it approved graduates unable to take dictation at a reasonable degree of speed or write accurate letters on the machine. Here the school standard and the commercial standard are approximately equivalent. To be satisfied with less than this in the industrial department is to lose sight of time values. * * *

The manual training department of the schools of Montclair, N. J., has sought consistently to develop projects presenting a strong appeal to the pupils' interests which would, at the same time, show a product possessing a commercial valuation in excess of the actual cost when labor, supervision, and material were all included. * * *

Necessarily many projects are undertaken in the manual training course that do not show a commercial profit. * * * When a job is undertaken on a commercial basis, money and time values are reckoned closely, but educational jobs can not be put on the same basis.²⁶

In urging better organization of manual work in the elementary schools, the California State commissioner of industrial and vocational education calls attention to the difficulties involved in the attempt to realize at the same time the general development values of the educational philosophers and the training values desired by the industrial world. He suggests, as the dominant purposes of manual training instruction in the seventh and eighth grades—

to develop a larger mental grasp of the industrial occupations of the community, to provide opportunity for the pupil to try his hand at some of the simpler operations of the various crafts, and to develop such hand control and skill as may naturally grow out of such operations.²⁷

To accomplish these aims, Commissioner Snyder proposes that the instruction include: (1) Home occupations of an industrial character—repair of furniture; screen making, fitting, hanging; window repairing, door repairing; study of adjustments, and minor repairs of plumbing fixtures, heating and lighting systems, and electrical apparatus; sewing machines, and other household equipment; (2) study of machines that produce and develop power, light, and heat—disassembling, assembling, and operating of as great variety as may be practicable of machines and appliances found in the vicinity.

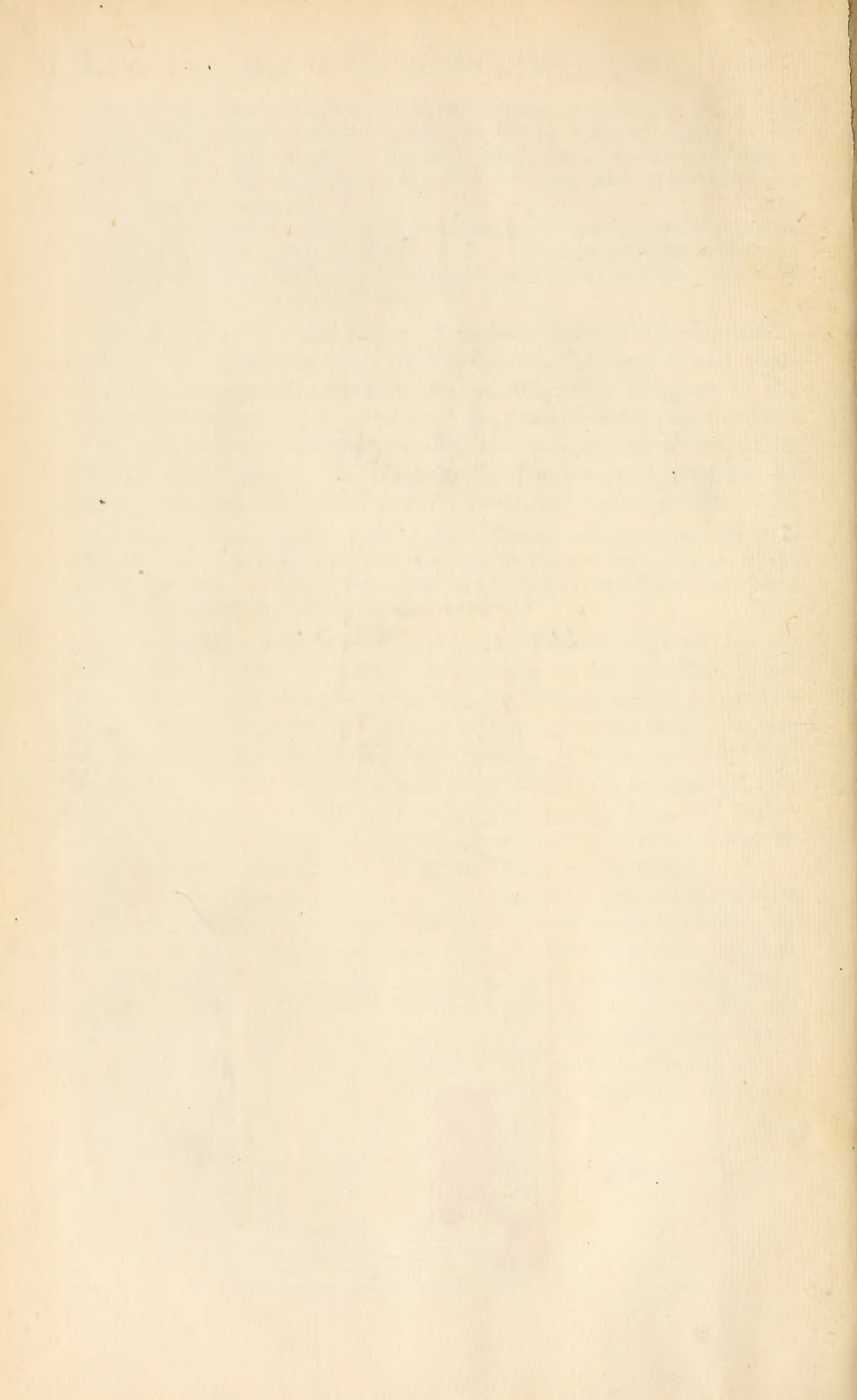
For the carrying out of such a program, many school laboratories of the traditional type would need to be transformed gradually, by adding items of equipment from time to time, and shop teachers in many cases would need to supplement their training and experience by evening school or summer work along new lines. The development in these directions which has already taken place in the public schools of many progressive cities is fully as striking and as significant as any other phase of the vocational education movement.

²⁶ Bliss, D. C. Commercial efficiency in manual training. *Indus. Arts Mag.*, IX, 4, pp. 151-153, Apr., 1920.

²⁷ Snyder, E. R. Manual training in elementary schools of California. *Indus. Arts Mag.*, IX, No. 1, pp. 30-31, Jan., 1920.



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